

Reservoir Water Quality Modeling and Enhancement

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Reclamation has the responsibility of managing dams and storage facilities to meet Water Quality Standards, both in the reservoir and in the stream reaches below the dams. Water quality models are a cost effective tool for studying different operational and structural changes that can be implemented to maintain or improve the water quality in reservoirs and their downstream releases. This research is aimed at developing models to simulate selective withdrawals as modified operations or outlet locations. The models are operational, and the current emphasis is to improve methods of data compilation and data output displays. Improved graphic displays can present the model results more effectively than large files or data tables.

The objectives were to: (1) improve the usability of the simulation models such as BETTER and CE-QUAL-W2 by improving the manner in which the data are compiled from many different sources and (2) enhance how the output data from the models are displayed graphically instead of in data files and tables.

Lake Powell was modeled and calibrated for years 1992 and 1993. Simulations for alternate elevation releases and modified operations were run. Data and release temperatures that can be used to increase the downstream temperatures for endangered fish were provided to the design team for the proposed TCD (temperature control device).

Improved methods of plotting the profiles and contour plots of the temperatures and electrical conductivity were developed and can be generalized for any other lake or reservoir. Both these graphs and plots of the input data and release data were enhanced by the use of special macros developed for Lotus and a commercial software package SURFER. Additional software plotting program are under investigation to improve the plotting capability to include animation of the model results.

The Upper Colorado Region, the TVA, the Corps of Engineers, and the Grand Canyon Monitoring and Research Center in Flagstaff.

George, Robert L. 1999. Application of the BETTER Model to Lake Powell, Technical Service Center, Denver. (Draft).

George, Robert L. 1999. Presentation to the TCD project review meeting on simulation model results in Salt Lake City.